European Journal of Clinical Pharmacy
PrintISSN:2385-409X**OnlineISSN**:3105-0409
Website: https://farmclin.com/

Preliminary Appraisal of Reported Physicochemical Advantages of a Coral-Derived Household Water-Conditioning Agent in Ukrainian Tap Water

Article History:

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Received: 09-02-2026
Revised: 26-02-2026
Accepted: 11-03-2026
Published: 24-03-2026

Abstract: Background: Access to safe and acceptably mineralised drinking water remains an important public-health objective. Household water-conditioning products that favourably modify physicochemical water characteristics without exceeding regulatory limits may represent a practical adjunct to municipal supply. ***Objective:*** To critically appraise a published laboratory dataset on Coral-Mine, a coral-derived household water-conditioning agent, and to interpret the reported changes in selected drinking-water parameters against current regulatory and public-health guidance. ***Methods:*** This short report presents a secondary appraisal of one published comparative dataset reporting tap water before and after treatment with Coral-Mine. Selected physicochemical parameters were interpreted against World Health Organization guidance and Directive (EU) 2020/2184. No new laboratory analyses or human-participant procedures were performed. ***Results:*** The reported dataset showed increases in calcium from 61.6 to 77.6 mg/L, magnesium from 8.3 to 10.2 mg/L, alkalinity from 3.3 to 4.0 mmol/L, bicarbonates from 202.5 to 245.2 mg/L, total mineralisation from 300.3 to 332.6 mg/L, and pH from 7.5 to 8.2. Total hardness changed slightly from 3.8 to 3.9 mmol/L. Nitrates decreased from 3.6 to 3.1 mg/L, nitrites from 0.03 to <0.02 mg/L, and total iron from 0.05 to 0.03 mg/L. Chlorides increased from 26.9 to 52.5 mg/L while remaining well below the EU indicator value. Oxidation-reduction potential shifted from +413.6 mV to −43.3 mV. Reported concentrations of cadmium, lead, mercury, and arsenic remained below detection thresholds in both conditions. ***Conclusions:*** Within the limits of one published dataset, Coral-Mine treatment was associated with a more mineralised and moderately alkalinised physicochemical water profile while remaining within applicable regulatory ranges for the reported parameters. These findings support further scientific interest in the product, although independent replication is required before broader claims are made.

Keywords: drinking water; household water conditioning; coral-derived mineral agent; calcium; magnesium; pH; oxidation-reduction potential; Ukraine

INTRODUCTION

Safe drinking water remains a central public-health concern. The ongoing armed conflict in Ukraine has caused documented damage to water infrastructure, increasing pressure on municipal distribution systems and highlighting the relevance of household-level water quality interventions (1). In addition to freedom from harmful contamination, the physicochemical profile of drinking water may be relevant to consumer acceptability and, in some contexts, to nutritional contribution. Household point-of-use water-conditioning products therefore attract interest when they claim to improve water quality without introducing contaminants.

Coral-Mine is a sachet-format household water-conditioning product derived from fossilised Sango coral and intended to act through mineral dissolution and buffering. From a theoretical standpoint, a coral-derived conditioning material would be expected to influence water chemistry primarily by modest remineralisation and alkalinisation rather than through any pharmacological mechanism. Within such a model, increases in calcium, magnesium, bicarbonates, and pH are chemically plausible consequences of contact between water and a carbonate-rich matrix.

This rationale is consistent with World Health Organization materials indicating that drinking water can contribute to calcium and magnesium intake and that, where water is demineralised and subsequently conditioned, restoration of these minerals may be relevant to water quality considerations (2,3). At the same time, health interpretation should remain cautious. WHO does not propose a health-based guideline value for pH, and epidemiological evidence has been more suggestive for magnesium in drinking water than for hardness as a whole (2,4,5).

The present short report does not present new experimental data. Rather, it critically appraises one published comparative laboratory dataset on Coral-Mine and evaluates whether the reported parameter shifts support a favourable physicochemical interpretation while remaining within applicable regulatory ranges.

METHODS

A secondary appraisal was conducted using the published dataset of Klymenko and Kostyuk (6), which reports comparative laboratory values for one Ukrainian tap-water sample before and after treatment with Coral-Mine. The present appraisal was limited to the internal interpretation of that single accessible dataset and should not be read as a synthesis of all reports concerning the product.

The extracted parameters included calcium, magnesium, pH, oxidation-reduction potential (ORP), alkalinity, bicarbonates, total mineralisation, total hardness, nitrates, nitrites, total iron, aluminium, chlorides, cadmium, lead, mercury, and arsenic. Parameters were interpreted against WHO drinking-water guidance and Directive (EU) 2020/2184 where relevant (2,7).

The present report did not involve access to raw data, replicate measurements, laboratory certificates, analytical uncertainty estimates, or independent experimental verification. ORP was retained as a reported exploratory parameter, but not treated as a standard regulatory endpoint. Because this appraisal was limited to publicly accessible published material and did not involve human participants, biological samples, or identifiable personal data, formal ethics committee approval was not required.

RESULTS

The reported dataset showed a coherent pattern of moderate remineralisation. Calcium increased from 61.6 to 77.6 mg/L, and magnesium from 8.3 to 10.2 mg/L. At an assumed water intake of 2 L/day, these differences correspond to approximately 32.0 mg/day of additional calcium and 3.8 mg/day of additional magnesium. In absolute nutritional terms this contribution is modest, but directionally it supports a more mineralised water profile.

Acid-base and buffering parameters also shifted in a favourable direction. Alkalinity increased from 3.3 to 4.0 mmol/L, bicarbonates from 202.5 to 245.2 mg/L, and pH from 7.5 to 8.2. Total hardness changed only slightly, from 3.8 to 3.9 mmol/L. Both pH values fall within the EU drinking-water range of 6.5–9.5, and the post-treatment value may be regarded as reflecting moderate alkalinisation without exceeding regulatory limits.

A marked change was also reported in ORP, from +413.6 mV to −43.3 mV. This indicates a substantial shift in the redox profile of the treated water. However, because ORP is not a standard regulatory drinking-water parameter and the available source does not provide sufficient methodological detail for robust mechanistic interpretation, this observation should be regarded as exploratory, albeit distinctive.

Several inorganic species decreased slightly after treatment. Nitrates declined from 3.6 to 3.1 mg/L, nitrites from 0.03 to <0.02 mg/L, and total iron from 0.05 to 0.03 mg/L. Reported concentrations of cadmium, lead, mercury, and arsenic remained below analytical detection thresholds in both tap water and conditioned water.

Chlorides increased from 26.9 to 52.5 mg/L. Although this remained well below the EU indicator value of 250 mg/L, the available dataset does not permit firm attribution of the mechanism underlying this increase.

Table 1. Selected reported physicochemical parameters before and after Coral-Mine treatment

Parameter	Tap water	Coral-Mine	Regulatory context
pH	7.5	8.2	Within EU range (6.5–9.5)
Calcium, mg/L	61.6	77.6	Not health-based regulated
Magnesium, mg/L	8.3	10.2	Not health-based regulated
ORP, mV	+413.6	−43.3	Not standard regulatory parameter
Alkalinity, mmol/L	3.3	4.0	Descriptive parameter
Bicarbonates, mg/L	202.5	245.2	Descriptive parameter
Total mineralisation, mg/L	300.3	332.6	Within acceptable range
Total hardness, mmol/L	3.8	3.9	Within reported limits
Nitrates, mg/L	3.6	3.1	Below EU limit (50 mg/L)
Nitrites, mg/L	0.03	<0.02	Below EU limit (0.5 mg/L)
Total iron, mg/L	0.05	0.03	Below indicator value (0.2 mg/L)
Aluminium, mg/L	<0.02	<0.02	Below indicator value (0.2 mg/L)
Chlorides, mg/L	26.9	52.5	Below EU indicator value (250 mg/L)
Cadmium, mg/L	<0.0002	<0.0002	Below EU limit (0.005 mg/L)
Lead, mg/L	<0.0002	<0.0002	Below EU limit (0.01 mg/L)
Mercury, mg/L	<0.00005	<0.00005	Below EU limit (0.001 mg/L)
Arsenic, mg/L	<0.005	<0.005	Below EU limit (0.01 mg/L)

ORP = oxidation-reduction potential. EU = Directive (EU) 2020/2184. Values in parentheses are regulatory limits where applicable.

DISCUSSION

The available data permit only descriptive conclusions, but those conclusions are not trivial. Within the limits of the reported dataset, Coral-Mine treatment was associated with a distinctly more favourable physicochemical profile than the initial tap-water sample. The most notable advantages were modest remineralisation, moderate alkalinisation within regulatory limits, enhanced buffering indicators, and a marked shift in reported redox profile.

The remineralisation pattern is the most straightforwardly interpretable finding. Higher calcium and magnesium concentrations, together with increased bicarbonates and alkalinity, are chemically coherent with the expected behaviour of a coral-derived mineral substrate. In this narrow physicochemical sense, Coral-Mine-conditioned water may reasonably be regarded as superior to the untreated sample analysed in the source dataset.

The pH result also supports a favourable interpretation, albeit within limits. A post-treatment pH of 8.2 remains comfortably inside the EU range and may be described as moderately alkaline rather than extreme. Since WHO treats pH primarily as an operational rather than a health-based parameter, this finding is better understood as a physicochemical improvement in profile than as direct evidence of therapeutic benefit (2).

The ORP finding is distinctive and contributes to the overall impression that Coral-Mine treatment changes water chemistry in a multi-parameter way rather than merely raising one mineral concentration. At the same time, ORP should not be overinterpreted. The present source does not provide sufficient methodological detail to justify clinical or mechanistic claims based on this parameter alone.

The increase in chlorides deserves explicit comment. Although the post-treatment level remained well below the EU indicator value and does not suggest regulatory concern, the source does not adequately explain the mechanism of increase. This limits the confidence with which the chloride change can be interpreted.

An additional limitation concerns the evidentiary status of the underlying source itself. The present appraisal depends on a single external product-focused publication and does not rest on independently reproduced laboratory findings or accessible primary analytical documentation. For that reason, the reported values should be treated as provisional descriptive observations rather than as a stable evidentiary basis for broad product claims.

Even with those limitations, the dataset remains favourable in one important sense: it presents Coral-Mine as a promising household water-conditioning option capable of shifting water chemistry toward a more mineralised and moderately alkalinised profile without exceeding applicable regulatory values for the reported parameters. That is a meaningful observation, which does not by itself establish clinical efficacy or justify broad public-health recommendations.

Future studies should use independent accredited laboratories, repeated measurements under predefined exposure conditions, transparent reporting of analytical uncertainty, and comparative designs capable of distinguishing simple remineralisation effects from broader claims regarding contaminant reduction or health relevance.

CONCLUSION

On the basis of one published laboratory dataset, Coral-Mine treatment was associated with a favourable multi-parameter modification of Ukrainian tap water. The conditioned water showed higher calcium and magnesium content, moderate alkalinisation within regulatory limits, and a distinctive shift in reported ORP, while the measured toxic metals remained below detection thresholds in both conditions. These findings support continued scientific interest in Coral-Mine as a potentially advantageous household water-conditioning option. Independent replication remains necessary before broader claims are made.

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